

ENERGY

Solar Cables



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TECSUN (PV) PV1-F Cables for Photovoltaics





Technical Data

Manufacturer:	Prysmian Kabel und Systeme GmbH Kabelwerk Neustadt bei Coburg / Germany
Trademark:	TECSUN (PV)
Type designation:	PV1-F
Approvals:	Requirements for cables for PV systems, DKE/VDE AK 411.2.3 VDE-Reg.No. 7985 TÜV 2 PFG 1169/08.2007 Cert.-No. R 60013989
Application:	PRYSMIAN TECSUN(PV)PV1-F PV-Wire is intended for use in Photovoltaic Power Supply Systems: Indoor and/or outdoor, in industrial and agriculture fields. They are suitable for applications in/at equipment with protective insulation (Protecting Class II), in explosion hazard areas (PRYSMIAN Internal Testing) and may be installed as well as fixed or freely suspended or free movable. Installation in cable trays, conduits, on and in walls is available.
PRYSMIAN Internal Testing:	TECSUN(PV) PV1-F PV-Wire is permitted for direct burial.

ELECTRICAL PARAMETERS	
Rated Voltage:	(U ₀ /U) 600/1000V AC
Maximum PV-System voltage:	DC up to 2000V possible
Maximum permissible operating voltage in AC systems:	700/1200V
Maximum permissible operating voltage in DC systems:	900/1800V
Test voltage:	6500V AC / 15000V / 5 min.
Ampacity:	Meets requirements for PV-Wire per TÜV 2 PFG 1169/08.2007
Tests -TÜV 2PFG 1169/08.2007:	Meets VDE 0282 Section 2, HD 22.2 and EN 50395 Conductor Resistance, Test Voltages AC and DC, Electric Strength, Surface Resistance, Spark Test on Insulation, EN 50305 Part 6 DC stability (10 days, 85°C, salt water, 1500V DC), Insulation Resistance at 20°C and 90°C in Water.
PRYSMIAN Internal Testing:	Insulation Resistance at 120°C in Air.

Technical Data

THERMAL PARAMETERS

Ambient Temperature:	From -40°C up to +90°C (-40°F up to +194°F) for fixed and flexible installation
Maximum Permissible Conductor Operating Temperature:	+120°C (+248°F) per IEC 60216 permanent temperature 120°C for 20.000 h (= 2.3 years), at max. 90°C permanent temperature (= 30 years)
Short-circuit temperature -TÜV 2 PfG 1169/08.2007: -PRYSMIAN Internal Testing:	+200°C (392°F) at the conductor max. 5 sec. +250°C (482°F) at the conductor max. 5 sec.
Resistance to cold:	Cold Bend Test at -40°C temperature per DIN EN 60811-1-4 Impact Test -40°C temperature similar to DIN EN 50305
Damp-Heat Test:	Meets TÜV 2 PfG 1169/08.2007 1.000h at 90°C and 85% humidity and per EN 60068-2-78

MECHANICAL PARAMETERS

Tensile Rating:	15 N/mm ² in operation, 50 N/mm ² during installation per HD 516 DIN VDE 0298 Section 3 § 7.1 and Section 300 § 5.4.1
Minimum bending Radius:	min. 4 x D (D=Overall Cable Diameter)
Abrasion -PRYSMIAN Internal Testing:	Meets DIN EN 53516: against abrasive paper, Sheath against sheath, Sheath against metal, Sheath against plastics
Shrinkage Test:	Meets TÜV 2 PfG 1169/08.2007 <2% per EN 60811-1-3
Pressure Test at High Temperature:	Meets TÜV 2 PfG 1169/08.2007 <50% per EN 60811-3-1
Dynamic Penetration Test:	Meets requirements for PV-Wire per TÜV 2 PfG 1169/08.2007
Shore-Hardness A:	85 per DIN EN 53505 (PRYSMIAN Internal Testing)
Gnawer resistance:	Safety can be optimized by utilizing protective hoses and cables with spinning or braid metallic coatings

CHEMICAL PARAMETERS

Mineral Oil Resistance:	Meets VDE 0473-811-2-1, DIN EN 60811-2-1 24h, 100°C
Acid and Alkaline Resistance:	Meets TÜV 2 PfG 1169/08.2007 7 days, 23°C (N-Oxalic Acid, N-Sodium Hydroxide) per EN 60811-2-1
Ammonia Resistance:	30 days in Saturated Ammonia Atmosphere (PRYSMIAN Internal Testing)
Weather resistance - TÜV 2 PfG 1169/08.2007: - PRYSMIAN Internal Testing:	Ozone resistance per DIN EN 50396 Test Type B, HD 22.2 Test Type B UV-Resistance per UL 1581 (Xeno-Test), ISO 4892-2 (Method A) and HD506/A1-2.4.20 Absorption of Water (Gravimetric) per DIN EN 60811-1-3
Fire Behaviour - TÜV 2 PfG 1169/08.2007: - PRYSMIAN Internal Testing:	Flame propagation: Single Cable Flame Test per IEC 60332-1-2, DIN EN 60332-1-2 Halogen-free per IEC 60754-1 No Corrosivity per IEC 60754-2 Multiple Cable Flame Test per DIN EN 50305-9 Low Smoke Emission per IEC 61034, EN 61034 (Light Transmittance > 70%) Low Toxicity per DIN EN 50305, ITC < 3
Environmentally Friendly:	TECSUN (PV) PV-Wire complies with RoHS directives 2002/95/EG, 2005/69/EG and 2006/122/EG of the European Union

DIRECT BURIAL

Installation Instruction:	Installation Conditions per VDE 0800 Section 174 § 5.4.2 and VDE 0891 Section 6 § 4.2 ratings
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Design Features

Type designation:	TECSUN (PV) PV1-F
Conductor:	Electrolytic tinned copper, Class 5 in accordance with IEC 60228 (VDE 0295)
Insulation:	HEPR 120°C similar to IEC 60502-1 (compound type EI6 / EI8)
Core identification:	Natural colour - White
Sheath:	Cross-linked EVA rubber 120 °C based on DIN EN 50563-2-1 (compound type EM4 / EM8) Insulation and sheath are connected solidly (Two-layer-insulation)
Sheath-colours:	black, blue, red
Marking:	(rhombus) PRYSMIAN TECSUN (PV) PV1-F (cross-section) 0.6/1 KV (VDE-REG. / TÜV)

Selection and Ordering Data

Nominal cross-section and colour	Order No.	Conductor diameter [mm]	Overall diameter of cable Min. value [mm]	Overall diameter of cable Max. value [mm]	Approx. net weight [kg/km]	Minimum bending radius [mm]	Maximum permissible tensile load [N]	Current carrying capacity at 60°C ambient temperature (free in air) [A]	Permissible short circuit current (1s) [kA]
1,5mm² black	5DH93011	1,6	4,4	4,8	29	14,4	23	29	0,19
1,5mm² blue	5DH93012	1,6	4,4	4,8	29	14,4	23	29	0,19
1,5mm² red	5DH93013	1,6	4,4	4,8	29	14,4	23	29	0,19
2,5mm² black	5DH93012	1,9	4,7	5,1	43	15,3	38	41	0,32
2,5mm² blue	5DH93022	1,9	4,7	5,1	43	15,3	38	41	0,32
2,5mm² red	5DH93023	1,9	4,7	5,1	43	15,3	38	41	0,32
4,0mm² black	5DH93031	2,4	5,2	5,6	58	16,8	60	55	0,50
4,0mm² blue	5DH93032	2,4	5,2	5,6	58	16,8	60	55	0,50
4,0mm² red	5DH93033	2,4	5,2	5,6	58	16,8	60	55	0,50
6,0mm² black	5DH93041	2,9	5,7	6,1	76	18,3	90	70	0,76
6,0mm² blue	5DH93042	2,9	5,7	6,1	76	18,3	90	70	0,76
6,0mm² red	5DH93043	2,9	5,7	6,1	76	18,3	90	70	0,76
10mm² black	5DH93051	4,0	6,8	7,2	120	21,6	150	98	1,26
16mm² black	5DH93061	5,5	8,3	9,0	178	36	240	132	2,01
25mm² black	5DH93071	6,4	10,0	10,7	273	43	375	176	3,15
35mm² black	5DH93081	7,5	11,1	11,8	364	47	525	218	4,41
50mm² black	5DH93091	9,0	12,6	13,3	500	53	750	276	6,30
70mm² black	5DH93101	10,8	14,4	15,2	686	61	1.050	347	8,82
95mm² black	5DH93111	12,6	16,2	17,0	899	68	1.425	416	12,0
120mm² black	5DH93121	14,3	17,7	18,7	1.131	75	1.800	488	15,1
150mm² black	5DH93131	15,9	19,7	20,7	1.382	83	2.250	566	18,9
185mm² black	5DH93141	17,5	21,3	22,3	1.669	89	2.775	644	23,3
240mm² black	5DH93151	20,5	24,2	25,5	2.208	102	3.600	775	30,4

Technical data, dimension and weights are subject to change. PRYSMIAN Germany Version: 1.4 - Date: 2012-02-08

TECSUN DUO (PV)

Cables for Photovoltaics





Technical Data

Manufacturer:	Prysmian Kabel und Systeme GmbH Kabelwerk Neustadt bei Coburg / DE
Trademark:	TECSUN DUO (PV) PV1-F
Type designation:	PV1-F
Approvals:	Requirements for cables for PV systems, DKE/VDE AK 411.2.3 VDE-Reg. No. 7985 TÜV 2 PFG 1169/08.2007 Cert.No. R 60013989
Application:	PRYSMIAN Solar cables TECSUN DUO (PV) are intended for use in photovoltaic power supply systems and similar applications as free movable, free hanging, fixed installation and buried in ground in constructional secured systems. The cables can be used indoor, outdoor, in explosion hazard areas, in industry and agriculture. They are suitable for applications in/at equipment with protective insulation (protecting class II). In other respects IEC 61215 and 61646, IEC 60364-7-712:2002 and DIN VDE 0100 part 520 applies.

ELECTRICAL PARAMETERS	
Rated Voltage:	AC 0.6/1.0 kV
Maximum PV-System voltage:	DC up to 2.0 kV possible
Maximum permissible operating voltage in AC systems:	0.7/1.2 kV
Maximum permissible operating voltage in DC systems:	0.9/1.8 kV
Test voltage:	AC 6 kV / DC 10 kV (15 min.)
Ampacity:	According to Requirements for cables for PV systems, DKE/VDE AK 411.2.3
Tests	According to HD 22.2 - conductor resistance, test voltages AC and DC, electric strength, surface resistance, spark test on insulation, insulation resistance at 20°C and 90°C in water and at 120°C in air. EN 50305 Part 6 - DC-stability (10 days, 85°C, salt water, 1.5 kV DC)

Technical Data

THERMAL PARAMETERS

Maximum permissible ambient temperature:	+90°C (stationary and in motion)
Minimum permissible temperature:	-40°C (stationary and in motion)
Maximum permissible operating temperature of the conductor:	+120°C; Interpretation according to IEC 60216: permanent temperature 120°C for 20.000 h (= 2.3 years), at max. 90°C permanent temperature (= 30 years)
Short-circuit temperature:	+250°C (at the conductor max. 5 sec.)
Resistance to cold:	Bending test at low temperature according to DIN EN 60811-1-4 Impact test similar to DIN EN 50305
Damp-Heat Test:	According to EN 60068-2-78 1.000h at 90°C and 85% humidity

MECHANICAL PARAMETERS

Tensile load:	15 N/mm ² in operation, 50 N/mm ² during installation
Minimum bending radii:	see selection and ordering data
Abrasion:	According to DIN EN 53516: against abrasive paper Sheath against sheath (internal testing) Sheath against metal (internal testing) Sheath against plastics (internal testing)
Shrinkage test:	According to EN 60811-1-3
Pressure test at high temperature:	According to EN 60811-3-1
Dynamic penetration test:	According to Requirements for cables for PV systems, DKE/VDE 411.2.3
Shore-hardness:	85 according to DIN EN 53505
Gnawer resistance:	An optimum safety can be reached with protective hoses and by use of special cable types with metallic coating such as spinning or braid.

CHEMICAL PARAMETERS

Mineral oil resistance:	24h, 100°C according to DIN VDE 0473-811-2-1, DIN EN 60811-2-1
Acid and alkaline resistance:	According to EN 60811-2-1 7 days, 23°C (N-Oxalic acid, N-Sodium hydroxide)
Ammonia resistance:	30 days in saturated ammonia atmosphere (internal testing)
Weather resistance:	Ozone resistance according to DIN EN 50396 test type B, HD 22.2 test type B UV-resistance according to UL 1581 (Xeno-Test), ISO 4892-2 (Method A) and HD506/A1-2.4.20 Absorption of water (gravimetric) according to DIN VDE 0473-811-1-3, DIN EN 60811-1-3
Behaviour in case of fire:	Flame propagation Single cable according to DIN VDE 0482 Part 332-1-2, DIN EN 60332-1-2 Multiple cable according to DIN VDE 0482 Part 266-2-5, DIN EN 50305-9 Low smoke emission according to DIN VDE 0482 Part 268-2, DIN EN 50268-2 (light transmittance > 70%) Corrosivity according to DIN EN 50267-2-2 Toxicity according to DIN EN 50305, ITC-index < 3
Ecological innocuousness:	TECSUN DUO (PV) cables are in accordance with the codes 2000/53/EG, 2002/96/EG, 2003/11/EG and exempt from metallic lead-, mercury-, hexavalent chromium- und bromine containing compounds. RoHS conform.



Design Features

Type designation:	TECSUN DUO (PV) PV1-F
Conductor:	Electrolytic copper, tinned, Class 5 according to IEC 60228 (DIN VDE 0295)
Insulation:	HEPR 120°C similar to IEC 60502-1 (compound type EI6 / EI8)
Core identification:	+ pole red, - pole black
Sheath:	EVA 120 °C based on DIN VDE 0282 part 1, HD 22.1 (compound type EM4 / EM8) Insulation and sheath are connected solidly (Two-layer-insulation)
Sheath-colours:	black
Marking:	(rhombus) PRYSMIAN TECSUN (PV) PV1-F (cross-section) 0.6/1 KV (VDE- REG./TÜV)

Selection and Ordering Data

Nominal cross-section and colour	Order No.	Conductor diameter [mm]	Overall diameter of single cable Min. value [mm]	Overall diameter of single cable Max. value [mm]	Approx. net weight Twin Cable [kg/km]	Minimum bending radius [mm]	Maximum permissible tensile load [N]	Current carrying capacity at 60°C ambient temperature (free in air) [A]	Permissible short circuit current (1s) [kA]
2x 4 black	-	2.4	5.2 each	5.6 each	116	16.8	60	44	0.50
2x 6 black	-	2.9	5.7 each	6.1 each	152	18.3	90	56	0.76
2x10 black	-	4.0	6.8 each	7.2 each	240	21.6	150	78	1.26

Technical data, dimension and weights are subject to change. PRYSMIAN Germany Version: 1.0 - Date: 2010-11-30

TECPLUG PV Connectors





Technical Data

Manufacturer:	PRYSMIAN Kabel und Systeme GmbH Cable plant Neustadt near Coburg / DE in Cooperation with Wieland Electric GmbH, Bamberg
Trademark:	TECPLUG
Type designation:	PST40I1
Approvals:	DIN V VDE V 01263 TÜV Certificate No. R 60018371 IEC 617301
Application:	PRYSMIAN Solar connectors TECPLUG are intended for the use in photovoltaic power supply systems at tensions up to 1.000V DC and currents up to 40A per contact according to application class A. Outdoor and indoor usage as fixed or free installation is permitted. They are suitable for applications in/at equipment with protective insulation (protecting class II).

ELECTRICAL PARAMETERS	
Rated Voltage:	1.000 V
Overvoltage category:	3
Protection class:	II
Test voltage:	6 kV AC (1 min.)
Ampacity:	According to IEC 60512
Rated current (85°C) for cross sectional areas	
- 1,5 mm²:	17,5 A
- 2,5 mm²:	24 A
- 4,0 mm²:	32 A
- 6,0 mm²:	40 A
- 10 mm²:	40 A
Contact resistance according to EN 60352-9:	< 1mOhm
Protection against accidental contact:	Test according to IEC 60512, Test load 10N
Clearance:	14mm according to IEC 606641
Creepage distance:	28mm according to IEC 606641
Impulse withstand voltage:	8 kV according to IEC 606641

Technical Data

THERMAL PARAMETERS

Max. permissible operating temperature:	110°C
Resistance to cold:	-40°C, Impact resistance test at low temperature according to DIN V VDE V 01263 (IEC 60068275)
Alternating temperature test:	-40°C to +85°C according to IEC 60068214, Test Nb
Damp heat test:	85°C, 85% rel. humidity for 1000h according to IEC 61215 10.13

MECHANICAL PARAMETERS

Crimp connection, withdrawal strength:	According to IEC 60352-2
Stress compensation for tensile load:	According to IEC 60512 17c
Stress compensation for torsional load:	According to IEC 60512 17d
Drop test:	According to IEC 60512 7b
Insertion/withdrawal cycles:	100 operations without load
Bending test:	According to DIN V VDE V 01263, similar to IEC603091
Strain relief:	According to IEC 60512-9
Pull off force:	80 N, according to IEC 60512 15f
Degree of protection:	IP 20 (unplugged) IP 68 (plugged)
Tightening torque:	3 - 3,5 Nm for cable glands to ensure strain relief and tightness

CHEMICAL PARAMETERS

Resistant against:	Oil and Grease, Alcohol, Ammonia, Acids and Alkalines, Seawater. Other resistances on request.
UV- and weather resistance:	According to ISO 49822, Method A
Corrosion protection:	According to ISO 6988
Behaviour in case of fire	
- Insulation material of body:	Test according to IEC 60695-11-20 Glow wire test according to IEC 61695-2-10, 650°C
- Insulation material carrying electrical contacts:	Test according to IEC 60695-11-10 Glow wire test according to IEC 61695-2-10, 650°C
- Combustion category:	V2 according to IEC 60695-11-10



Design Features

Specification:	Unipolar connector IP 68
Body:	Polyamide (PA66)
Sealing:	NBR (Nitrile-Butadien-Rubber)
Contact	
Male contact:	- solid (screw machined) male contact silverplated brass
Female:	- solid (screw machined) female contact silverplated brass
Marking:	PST40I1 Ampacity/Cross sectional area +(Female) or -(Male)
Nominal cross section:	1,5mm ² to 10mm ²
Trademark:	TECPLUG

Selection and Ordering Data

Description	Nominal cross-section	Length of cable	1. End	2. End (others on request)	No of items per unit	Order No.
TECPLUG, pre-assembled connectors						
Pre-assembled cord	1 x 1,5 mm ²	100 cm	Male	free	100 pieces	5DX8 1 S 01 100 0
Pre-assembled cord	1 x 1,5 mm ²	100 cm	Female	free	100 pieces	5DX8 2 S 01 100 0
Pre-assembled cord	1 x 2,5 mm ²	100 cm	Male	free	100 pieces	5DX8 1 S 02 100 0
Pre-assembled cord	1 x 2,5 mm ²	100 cm	Female	free	100 pieces	5DX8 2 S 02 100 0
Pre-assembled cord	1 x 4,0 mm ²	100 cm	Male	free	100 pieces	5DX8 1 S 04 100 0
Pre-assembled cord	1 x 4,0 mm ²	100 cm	Female	free	100 pieces	5DX8 2 S 04 100 0
Pre-assembled cord	1 x 6,0 mm ²	100 cm	Male	free	100 pieces	5DX8 1 S 06 100 0
Pre-assembled cord	1 x 6,0 mm ²	100 cm	Female	free	100 pieces	5DX8 2 S 06 100 0
Pre-assembled cord	1 x 10 mm ²	100 cm	Male	free	100 pieces	5DX8 1 S 10 100 0
Pre-assembled cord	1 x 10 mm ²	100 cm	Female	free	100 pieces	5DX8 2 S 10 100 0
Pre-assembled cord	1 x 1,5 mm ²	200 cm	Male	Female	100 pieces	5DX8 1 S 01 020 4
Pre-assembled cord	1 x 2,5 mm ²	200 cm	Male	Female	100 pieces	5DX8 1 S 02 020 4
Pre-assembled cord	1 x 4,0 mm ²	200 cm	Male	Female	100 pieces	5DX8 1 S 04 020 4
Pre-assembled cord	1 x 6,0 mm ²	200 cm	Male	Female	100 pieces	5DX8 1 S 06 020 4
Pre-assembled cord	1 x 10 mm ²	200 cm	Male	Female	100 pieces	5DX8 1 S 10 020 4

Selection and Ordering Data

Description	Nominal cross-section	Length of cable	1. End	2. End (others on request)	No of items per unit	Order No.
TECPLUG, for assembling						
Male connector	1,5 mm ²	-	-	-	100 pieces	5DX8 200 015 00
Female connector	1,5 mm ²	-	-	-	100 pieces	5DX8 100 015 00
Male connector	2,5 mm ²	-	-	-	100 pieces	5DX8 100 025 00
Female connector	2,5 mm ²	-	-	-	100 pieces	5DX8 200 025 00
Male connector	4,0 mm ²	-	-	-	100 pieces	5DX8 100 040 00
Female connector	4,0 mm ²	-	-	-	100 pieces	5DX8 200 040 00
Male connector	6,0 mm ²	-	-	-	100 pieces	5DX8 100 060 00
Female connector	6,0 mm ²	-	-	-	100 pieces	5DX8 200 060 00
Male connector	10 mm ²	-	-	-	100 pieces	5DX8 100 100 00
Female connector	10 mm ²	-	-	-	100 pieces	5DX8 200 100 00

Description	Nominal cross-section	Length of cable	1. End	2. End (others on request)	No of items per unit	Order No.
TECPLUG, bulkhead connectors						
Male connector	1,5 mm ²	-	-	-	100 pieces	5DX8 100 015 GA
Female connector	1,5 mm ²	-	-	-	100 pieces	5DX8 200 015 GA
Male connector	2,5 mm ²	-	-	-	100 pieces	5DX8 100 025 GA
Female connector	2,5 mm ²	-	-	-	100 pieces	5DX8 200 025 GA
Male connector	4,0 mm ²	-	-	-	100 pieces	5DX8 100 040 GA
Female connector	4,0 mm ²	-	-	-	100 pieces	5DX8 200 040 GA
Male connector	6,0 mm ²	-	-	-	100 pieces	5DX8 100 060 GA
Female connector	6,0 mm ²	-	-	-	100 pieces	5DX8 200 060 GA
Male connector	10 mm ²	-	-	-	100 pieces	5DX8 100 100 GA
Female connector	10 mm ²	-	-	-	100 pieces	5DX8 200 100 GA

Description	Nominal cross-section	Length of cable	1. End	2. End (others on request)	No of items per unit	Order No.
Accessories						
Tool kit	complete	-	-	-	1 piece	5DX8 000 000 WK
Tool kit	basic	-	-	-	1 piece	5DX8 000 001 WK
System kit		-	-	-	1 piece	5DX8 000 000 SK

Technical data, dimension and weights are subject to change. Version: 1.3 Date: 20090209

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A brand of the
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